Appl. No.: 10/663,594
Amendment dated October 21, 2004
Reply to Office action of July 28, 2004

REMARKS/ARGUMENTS

The claims have been amended to adopt the suggestions made by the Examiner in the Office Action. It is submitted that the claims are now in full compliance with 35 U.S.C. 112.

Claim 1 has been also amended by incorporating the subject matter of Claim 2, which has been cancelled.

Claims 1-5, 7 and 16 stand rejected under 35 U.S.C. 103 over Amano et al. EP 801428 A1 in view of JP 2-21675. Reconsideration by the Examiner and withdrawal of this rejection is solicited.

Amano et al. disclose a generator comprising semiconductor elements that are placed on a dielectric ceramic substrate. Contrary to the Examiner's opinion, it cannot be assumed that the ceramic substrates disclosed by Amano et al. inherently have a thermal conductivity of less than 0.5 W/mK, as recited in original claim 2 of the present application. To the contrary, the values of the thermal conductivity of the substrates used by Amano et al. are given in Table 2, page 6 of EP 0,801,428 and range from 2.93 to 25.6 W/mK.

When a substrate is made of a ceramic material having a thermal conductivity of 2.93 W/mK, the heat flux between the hot and cold junctions of the thermocouples is relatively high in the steady state, the temperature difference between these junctions becomes small and the electromotive force produced by the generator becomes low (see page 2, lines 24-39 and page 3, lines 1-8 of the specification of the present application, where the European patent to Amano et al. is cited and discussed).

The present invention proposes to use a substrate made of a microporous ceramic material having a thermal conductivity of less than 0.5 W/mK which is about 5 times lower than the lowest thermal conductivity disclosed by Amano et al., which means that the heat flux between the hot and cold junctions of the thermocouples in a generator according to the present invention is five times lower than the heat flux between the hot and cold junctions in the generator disclosed by Amano et al. This feature makes it possible to substantially increase the electromotive force and the electric power produced by the thermoelectric generator.

JP 2-21675 discloses a substrate of ceramic material for a thermopile, the substrate 3 comprising a first layer 1 of dense ceramics and a second layer 2 of porous ceramics which is

covered by the first layer **1** of dense ceramics. The thermoelectric elements forming the thermopile are on the first layer **1** of dense ceramics, not on the layer **2** of porous ceramics, which means that the heat flux between the hot and cold junctions of the thermocouples is determined by the thermal conductivity of the first layer **1**, i.e. by the thermal conductivity of a dense ceramics.

JP 2-21675 therefore does not teach that the thermoelectric elements forming the thermocouples are to be placed on the layer of porous ceramics.

It further does not teach that a microporous ceramic having a thermal conductivity of less than 0.5 W/mK should be used.

Consequently, neither Amano et al. nor JP-2-21675, nor any combination of these references arrives at the invention claimed by applicant. Accordingly, withdrawal of the rejection and allowance of all of the pending claims is solicited.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

Raymond O. Linker, Jr.
Registration No. 26,419

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
CLT01/4676391v1

Appl. No.: 10/663,594
Amendment dated October 21, 2004
Reply to Office action of July 28, 2004

CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the U. S. Patent and Trademark Office at Fax No. (703) 872-9306 on the date shown below.

Janet F. Sherrill

October 27, 2004
Date